

TTO BAA 07-20

TOPICS OF INTEREST

The DARPA Tactical Technology Office (TTO) has a long history of tackling difficult national security problems by developing new and novel military capabilities, platforms and systems with transformational military potential. Today, DARPA/TTO is exploring technological opportunities in five thrust areas: Advanced Platforms (Air, Sea, Space, and Ground), Space Operations, Robotic Systems, Directed Energy Systems, and Precision Strike capabilities.

BAA 07-20 is TTO's open solicitation for new ideas, concepts, technologies, and programs and is open to all responses consistent with TTO's mission.

Listed below are a number of representative technical concepts that are provided to give potential offerors additional guidance concerning current areas of particular interest to the office. The list is not intended to be complete and is not intended to discourage the submission of alternative technological approaches to address current and future military needs within the DARPA/TTO thrust areas.

Long Endurance Aircraft

TTO is interested in novel concepts and supporting technologies for long endurance air platforms. The office would like to explore opportunities to extend aircraft endurance by two orders of magnitude over that of current systems, so that platforms capable of carrying significant, militarily relevant payloads at high altitude would have an endurance measured in months. Relevant technologies might include novel aerostructures, materials, propulsion (hydrocarbon, electric, hydrogen, etc.), propulsion integration and control technologies, if they offer significant advantages in extending operational endurance. Architectural concepts and architecturally enabling technologies that might extend the fundamental limits of aircraft endurance, including technologies supporting autonomous servicing of aircraft in flight, autonomous refueling, autonomous rearming, formation and in-flight assembly of aircraft, are also of interest.

TTO is also interested in exploring the limits of rotorcraft endurance, with particular interest in enabling concepts that operate for extended durations at medium and low altitude with significant fraction of their flight time spend in hover or extremely slow flight.

TTO is interested in exploring new architectures to enable the use of very long endurance airborne platforms such as pseudo-satellites, to replace or augment capabilities that are traditionally offered by geostationary space capabilities.

Urban Aircraft

TTO is interested in concepts and technologies that expand air operations in urban environments, where man-rated Unmanned Aerial Vehicles (UAVs) could execute missions such as Combat Search and Rescue (CSAR), Medical Evacuation (MedEvac), and near ground airborne reconnaissance. Operating from street level to rooftop, these vehicles could support counter sniper, counter Improvised Explosive Device (IED), urban mapping, situational awareness and Electronic Warfare (EW) missions. We are also interested in multi UAV operations in complex urban terrain and in low cost obstacle avoidance approaches that could work in complex urban environments.

Precision Strike

TTO is interested in enabling technologies for generation skipping performance in long range strike capabilities and novel concepts for rapid, global reach conventional strike.

TTO is interested in novel concepts to affordably provide responsive fires from the air to small units using shared or dedicated unmanned strike capabilities.

TTO is interested in low cost autonomous systems capable of independent surveillance, monitoring, and protection of protected regions. Such systems could be particularly effective protecting linear infrastructure, such as pipelines, power transmission lines, borders, etc. Also of interest is the ability to deliver non-lethal deterrence from such a surveillance capability.

Maritime Operations

TTO is interested in novel applications of Unmanned Undersea Vehicles (UUV) and Unmanned Surface Vehicle (USV) capabilities to counter emergent Maritime threats, including distributed unmanned threats such as drift mines. Long endurance ocean-going platforms capable of unattended operations for extended periods may be valuable for these and other missions, and TTO is interested in concepts and enabling technologies for these platforms.

TTO is interested in novel concepts for counter submarine warfare.

TTO is interested in expanding the possibilities for maritime UAVs that enable tighter integration of UAVs with non-carrier naval vessels, including Short Take-Off and Landing (STOL) and seaplane concepts. Novel maritime and littoral applications for these aircraft are also of interest.

TTO is interested in novel applications capable of rapidly providing maritime war fighting capabilities from converted merchant container ship platforms as a strategic naval reserve capability.

Force Protection Technologies

TTO is strongly interested in enablers for improved vehicle and passenger survivability. Novel integrated concepts to increase survivability in lightweight military vehicles against both blast and Explosively Formed Projectile (EFP) weapons are very interesting, as are very low cost active defensive systems capable of protecting lightly armored military vehicles from bullets, Rocket Propelled Grenades (RPGs) and Anti-tank guided Missiles (ATGMs).

TTO is strongly interested in novel counter UAV capabilities including low cost airborne interdiction of UAVs and cruise missiles.

TTO is interested in aircraft survivability technologies and concepts. These may include self-protection using directed energy and kinetic capabilities to destroy incoming threats, as well as passive systems other than conventional stealth approaches that make platforms difficult to target or damage.

TTO is interested in technologies that can provide defense of extended areas (~ 1 km² or more) against rockets, artillery, mortars, bombs, and missiles.

Robotic Systems

TTO is interested in exploring military application of smaller ground robots, including the potential of human form robotic systems, which would be able to act in direct support of dismounted combat teams.

TTO is interested in novel boat concepts, manned and unmanned, to support riverine operations in high threat environments. This includes concepts for the joint operation of watercraft and aircraft and of manned and un-manned components.

TTO is interested in strap-on automation capabilities permitting rapid conversion of ground military transport to autonomous, robotic operation.

Space Operations and Situational Awareness

TTO is interested in improving the survivability of US space assets. We are looking for novel concepts for low cost, high quality, responsive space situational awareness that support rapid identification, attribution, defense from, and consequence management of direct ascent, co-orbital and other space attacks. The office is also interested in technologies that can enhance a satellite's abilities to detect, respond to, and survive attack.

TTO is interested in novel applications of microsattelites to provide militarily significant surge capabilities to in-theater users or to enable the rapid tactical replacement of space capabilities lost to attack. This might include applications of micro-satellites, both those that provide previously unavailable military capabilities and those that provide direct replacement of capabilities currently provided by large space systems.

TTO is interested in novel low cost space access capabilities.

Unconventional Warfare/ Stabilization Operations

TTO is interested in small aircraft that could transport a single individual and his equipment into and out of a combat zone but be carried by a single person for concealment or protection.

TTO is interested in new weapons concepts focused on making the dismounted war fighter increasingly effective.

TTO is interested in low cost UAV/space capabilities to provide surge communications in coordination with civilian infrastructure in support of humanitarian missions and Operations Other Than War (OOTW).

TTO is interested in novel applications of technology to problems in tagging, tracking and locating.

TTO is interested in novel concepts for high power, very light-weight, low-cost directed energy systems

Novel Aircraft Technologies

TTO is interested in work that would enable more capable aircraft. Example concepts include distributed aircraft propulsion and flow-control technologies to maintain laminar flow or to provide fluidic amplification of aerodynamic forces.

Other

TTO is interested in novel military vehicle hybrid engine technology to dramatically improve operational fuel efficiency and improve vehicle performance.

TTO is interested in key enablers to dramatically reduce manufacturing process costs for high technology, low rate advanced manufacturing.